

## 230 Faraday's Researches

in every endeavour to trace the source, strength, and variations of the voltaic current. Its effect was avoided in the experiments already described (772, etc.), by making contact between the plates P<sup>1</sup> and P<sup>2</sup> before the effect dependent upon the state of the solution in contact with the zinc plate was observed, and by other precautions.

777. When an apparatus like fig. 58 (753) with several

• platina plates was used, being connected with a battery able to force a current through them, the power which they acquired, of producing a reverse current, was very considerable.

778. *Weak and exhausted charges* should never be used at the same time with *strong and fresh ones* in the different cells of a trough, or the different troughs of a battery: the fluid in all the cells should be alike, else the plates in the weaker cells, in place of assisting, retard the passage of the electricity generated in, and transmitted across, the stronger

cells.  
Each  
zinc  
plate  
so  
circum-  
stance  
d has  
to be  
assiste-  
d in  
decom-  
posing  
power  
before  
the  
whole  
curren-  
t can  
pass  
betwe-  
en it  
and  
the  
liquid.  
So  
that, if  
in a  
battery  
of fifty  
pairs  
of  
plates,  
ten of  
the  
cells  
contai-  
n a  
weake-  
r  
charge  
than  
the  
others  
, it is  
as if  
ten  
decom-  
posing  
plates  
were  
oppose-  
d to  
the  
transit  
of the  
curren-  
t of  
forty  
pairs  
of  
genera-  
ting  
plates  
(767).  
Hence  
a  
serious  
loss of  
force,  
and  
hence  
the  
reason  
why, if  
the ten

pairs of plates were  
removed, the remaining forty pairs would be much  
more power-  
ful than the whole fifty.  
779. Five similar troughs, of ten pairs of plates  
each, were  
prepared, four of them with a good uniform charge  
of acid, and  
the fifth with the partially neutralised acid of a  
used battery.  
Being arranged in right order, and connected with  
a volta-elec-  
trometer (446), the whole fifty pairs of plates  
yielded i.i cubic  
inch of oxygen and hydrogen in one minute: but on  
moving one  
of the connecting wires so that only the four  
well-charged  
troughs should be included in the circuit, they  
produced with the  
same volta-electrometer 8.4 cubical inches of gas  
in the same  
time. Nearly seven-eighths of the power of the  
four troughs  
had been lost, therefore, by their association with  
the fifth trough.  
780. The same battery of fifty pairs of plates,  
after being  
thus used, was connected with a volta-  
electrometer (446), so  
that by quickly shifting the wires of  
communication, the  
current of the whole of the battery, or of any  
portion of it, could  
be made to pass through the instrument for  
given portions of  
time in succession. The whole of the battery  
evolved 0.9 of a  
cubic inch of oxygen and hydrogen in half a  
minute; the forty